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ABSTRACT

This guidebook is intended to provide introductory knowledge to adult education teachers and administrators who are interested in the purchase and use of microcomputers. Although the emphasis is on adult basic education, most information is applicable to adult secondary settings. Section 1 is a brief history of computer development. Section 2, on hardware and software, covers basic component parts of a microcomputer, types of computer-assisted instruction, other educational uses, and selection of courseware packages and hardware for purchase. The way in which a microcomputer works is the topic of section 3. The final section discusses the need for computer awareness and computer literacy. An appendix provides listings of educational computing organizations, educational microcomputer newsletters, microcomputer magazines, book catalogs, information networks, educational publishing companies, microcomputer manufacturers, software review catalogs, software catalogs, and other resource materials. (YLB)

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MICROCOMPUTER ASSISTED INSTRUCTION IN ADULT BASIC EDUCATION

BY

Karen C. Martin

U.S. DEPARTMENT OF EDUCATION
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TITLE Microcomputer Assisted Instruction in Adult Basic Education — ABE-8

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OBJECTIVES

1. To make recommendations about the advantages and limitations of those microcomputer components judged to be most suitable for use with Adult Basic Education students.
2. To provide guidelines for the selection of microcomputer software.
3. To familiarize selected local adult basic education directors and coordinators with microcomputer technology.

DESCRIPTION

Contact was made with microcomputer vendors and with all companies that sell educational software. Sixty software companies have provided the project with product information. On site visits are being made to educational settings in which computers are being used for student instruction. Meetings are being held with selected adult education program directors to familiarize them with the project. A final one day workshop will be held, with these directors to discuss information gathered by the project and to determine future goals.

This project is innovative in the field of adult basic education for several reasons. This specific student population has much to gain from exposure to microcomputers. In addition to receiving quality individualized instruction by computer this student group will become able to function successfully in our rapidly advancing technological society.

FUNDING

$14,410 September 10, 1981 - June 30, 1982

TARGET AUDIENCE

Adult Basic Education Program Directors

PRODUCT

The project will develop a handbook designed to aid program personnel in the selection of microcomputer hardware and software which is appropriate for use with adult basic education students. The handbook will contain the following information:

1. Background information on the use of computers in education
2. Explanation and description of hardware and software written in terms easily understood by a novice to computer technology
3. Information about the advantages and limitations of various microcomputer hardware components

4. Guidelines for the selection of educational software use in adult basic education programs
5. List of companies that sell software that may be appropriate for use in adult basic education programs
6. Recommendations for introduction of microcomputers into an adult basic education setting

The handbook will be completed by June 30, 1982. It will be distributed to adult education directors in Indiana.

EVALUATION

The project is basically a research oriented one. The evaluation of the achievement of project objectives is being done by a five member team of participant evaluators. These evaluators are all adult basic education program directors. They monitor the project to determine whether activities are being performed as scheduled.

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INTRODUCTION

"It appears inevitable that computers will have a major impact on education. Congress stressed in a subcommittee report from the House Committee on Science and Technology entitled 'Computer and the Learning Society' that the new information handling technologies - computers in particular - can have important effects on the practice of education at all levels. Virtually everyone who has written on the question agrees that the potential is enormous. The question now is not whether computers will find a place in education, but how. Their unquestioned impact on society as a whole is certain to penetrate the classroom eventually." (People and Computers: Who Teaches Whom? Henry Olds, Jr., Judah Schwartz, Nancy Willie, Education Development Center, Newton, MA 1980.)

This guidebook is the result of a ten month research project designed to investigate the potential for the use of microcomputers with the ABE (adult basic education) student population. Although the emphasis is on ABE, most of the information in the guidebook is applicable to adult secondary settings.

The intent of the information which follows is to provide introductory knowledge to adult education teachers and administrators who are interested in the purchase and use of microcomputers. A review of the current literature reveals that microcomputers are here to stay. These machines are not a passing fad. Currently over fifty percent of the nation's school systems have purchased microcomputers. The trend is toward a rapid increase in the use of microcomputers by K-12 students. It is vitally important for adult educators and their students to keep pace with the rapidly advancing computer technology. The quotations which follow are representative of current thought.

David Moursand, editor of The Computing Teacher magazine and an educator in the field of computers for the past sixteen years, describes the way in which the job market will change in the future.

"It is important that students understand the rapid changes that are occuring in the computer field and what the future is apt to bring. In particular, how will computers affect the job market and types of jobs that are available? Current automation of manufacturing in the

United States will eliminate ten million jobs over the next twenty years. A student who understands potential changes can plan accordingly. Decisions on career goals should take into consideration how computers have changed our world. This is an important part of computer literacy."

Denise Forman, a Research Associate for JEM Research in British Columbia, recently completed a search of the literature. The subject of computer awareness was included in the search.

"Perhaps the most powerful argument for the immediate and widespread introduction of computers into the school systems is Luehrmann's argument that 'the ability to use computers is as basic and necessary to a person's formal education as reading, writing, and arithmetic.' He contends that computing plays such a crucial role in everyday life and in the nation's technological future that 'the general public's ignorance of the subject constitutes a national crisis.'

"Daniel Watt points out that although in the past only a small percentage of the population ever had direct contact with computers, in the future, as the nation's economy becomes more dependent on information processing and high technology, 'we can expect the overwhelming majority of our working population to have significant interactions with computers as part of their daily work.'

"The important point being made is that computers will soon be everywhere and students who have not been exposed to them will be at a decided disadvantage when competing with those who have; and society generally will be at a disadvantage when confronting issues that have to do with the impact of computers on the individual and on society. In short, our students must become computer literate." (The Computing Teacher, Jan. 1982, Vol. 9, No. 5).

Microcomputers can work as powerful interactive teaching devices and they can provide students and teachers with access to a wealth of information. However, computers can also be used to steal large amounts of money and to modify personal records in ways in which an individual's life might be ruined. These things need to be understood by adult educators and their students because the more we know about computer technology, the better our chances are to remain in charge.

HISTORY OF COMPUTER DEVELOPMENT

A brief summary of the history of computer development provides an idea as to how rapidly this technology has progressed. The invention of the computer dates back to the 1820's, when an Englishman named Charles Babbage invented a device which he called the Difference Engine. The purpose of the machine was to do log calculations. Babbage built a small model that worked, but when he tried to build the large scale machine he discovered that it contained too many large parts that had to work together. The technology had not yet been developed to make the Difference Engine a working reality. According to Christopher Evans, author of The Micro Millennium, Babbage was ahead of his time.

> "Now if Babbage had been a sensible man - which he wasn't - this is the moment when he would have sat back and surveyed the tons of brass and pewter cogwheels, sprockets, and other knick-knacks and faced up to the fact that he was a hundred years ahead of his time. But, instead his restless mind began to consider an even more ambitious scheme. And at that moment the concept of the computer was born."

Babbage noted that his Difference Engine could only do one thing. He saw the possiblity for the creation of a machine that could perform several calculating operations and Babbage proceeded to attempt to build such a machine. He named it the Analytical Engine. He was unable to construct the computer, but a small model is on display in the Science Museum in London.

It took more than a century for technology to be developed that could convert Babbage's ideas into a usable machine. Germany, England and the United States had people building computers by the end of World War II. The first general purpose electronic computer built in the U.S. was called ENIAC (Electronic Numerical Intergration and Calculator). It was a huge machine which took up 3,000 square feet. For purposes of comparison, modern homes average about 2,500 square feet. ENIAC'S operation was dependent upon vacuum tubes and it required a team of electrical

engineers to run it. Its memory was small and it was not very reliable. By 1951, many of the problems had been overcome and the first commercially produced computer became available. It was called UNIVAC I and eventually over one hundred of these machines were built and sold. By the late 1950's Bell Labs had discovered semi-conductors. These are the substances such as silicon through which a flow of electricity can be controlled. Transistors were made that worked like vacuum tubes, but they were very small and could work tens of thousands of times faster than a vacuum tube. Computers grew smaller in size while computing capabilities greatly increased.

The development of the tiny silicon chip led to the creation of the microcomputer in mid 1970's. This chip made it possible to build a small home computer that is as powerful as a one million dollar computer of twenty years ago. There are many rags to riches stories involving microcomputers. One of the most well known is that of the founders of the Apple Computer Company. Two young men assembled a computer from scratch in a garage in California in 1976. They printed a flyer, opened a small store, and the rest is history. By 1978 Apple had made $800,000 in profits; three years later the profits had reached $40 million.

HARDWARE AND SOFTWARE

All microcomputers have three basic component parts.

These parts are a keyboard, a video monitor, and a tape or disk drive. The keyboard looks very much like a typewriter keyboard. Communication with the computer occurs when one types or inputs on the keyboard. The video monitor or CRT is similar to a television screen. Some microcomputers actually connect to a regular television; however, the quality of the screen image is often better with a CRT. Two types of drive mechanisms are available. A tape drive resembles a tape player and uses cassettes. A disk drive is a small box shaped structure into which a diskette is inserted. A diskette, also called a floppy disk, looks very much like a square 45 phonograph record. Although a tape drive is less expensive than a disk drive, the latter is preferable. A tape drive is slow. In order to gain access to information at the end of the tape one must start at the beginning and wait until the tape reaches the information desired. A disk drive can locate any information within a few seconds. Disks are also more reliable than programs on tape. The keyboard, video monitor, and tape or disk drive are referred to as hardware. The tape or diskette contain software programs.

An example of a classroom application provides an idea about how

the microcomputer can serve as a teacher's aide in an understaffed program. Suppose a very busy Mrs. Smith at the Long Valley ABE Center has a student who needs some help with subtraction. Mrs. Smith selects the disk which contains a subtraction program and inserts it into the disk drive. Quickly she and the student will see a menu appear on the screen. The menu is simply a table of contents which lists everything contained on the disk. One would expect to see several math skills listed, probably addition through fractions, because a 5¼ inch floppy disk contains the equivalent of 45 double spaced, typewritten pages. Each item on the menu has a code letter. Mrs. Smith types the code letter for subtraction and another menu is generated. It contains the subtraction subskills with an option for a placement test. Mrs. Smith chooses the placement test and the student is ready to work independently. After the student takes the placement tests, the computer program starts instruction at the exact level appropriate for the particular individual.

There are three popular types of computer assisted instruction commonly referred to as CAI.

Drill and Practice - A student is given practice in solving math problems, punctuating sentences, or matching synonyms and antonyms. No instruction is included.

Tutorial - This type of CAI provides instruction prior to drill and practice. A good tutorial has the capability to branch a student. This means that if a person is having difficulty with a skill such as subtracting three digit numbers which contain a zero, he or she will be branched back for more instruction. A student who is particularly adept in a subject can be branched forward rapidly.

Simulation - This method is most useful to teach situations which are dangerous, expensive, or not feasible for classroom work. For example, a pollution simulation allows the student to manipulate variables such as industrial smoke,

auto exhaust, and chemical pollutants in order to see the effects on the environment including smog, respiratory problems or acid rain.

In addition to CAI, a microcomputer has several other educational uses. It may be used to do the following things.

1. Keep detailed attendance records.
2. Inventory supplies.
3. Conduct vocational counseling.
4. Test students and grade results.
5. Keep track of individual student progress.
6. Teach computer programming.
7. Play educational games.
8. Teach word processing.
9. Teach computer literacy.
10. Tie into an information network or data base.

In order to do many of the activities on the preceeding list, it is necessary to purchase a software program with which to work.

The development of quality educational software or courseware has been slow. Until quite recently most of this software was inadequate. The first attempts at the creation of software for education were made by people without proper qualifications to do the job. The group included programmers who know little about the learning process and educators who lacked the technical knowledge to take full advantage of computer capabilities. A good software program is usually the result of a team development approach.

The ideal way in which to choose a courseware package is to preview it before purchase. The previewer should first go through the program choosing correct answers. In a second run mistakes should

be made to test the alternatives and routes given a student who is less than perfect.

The following list of questions should be answered before any planned educational software purchase. The first five questions are presented in the order in which they should be asked.

1. Will the program run or work on your hardware?
2. Does the program have a good curriculum design with stated objectives?
3. Was a team approach used to develop the program? Team members often include an educator, an instructional designer, and a programmer.
4. Is the material in the program presented in a way that is appropriate for use with adults?
5. Has the program been classroom tested?
6. Are the instructions for use of the program clear?
7. Is the program easy to use?
8. Does the program take advantage of computer capabilities by allowing student interaction? Some programs are nothing more than textbook reprints.
9. Is the program consistent in content and reading level?
10. Is the program interesting?
11. Are supplemental materials such as worksheets or books needed? If so, is there an additional charge?
12. Is the size and spacing of words and graphics acceptable?
13. Are spelling, grammar, and content correct?
14. Can the user control the pace at which material is presented?
15. Is the student referred to the teacher if a predetermined percentage of questions are answered incorrectly?
16. Will the program accept user mistakes without crashing? Crash means that the program sequence is disrupted.
17. Does the program provide the appropriate feedback and positive reinforcement to the student?

18. Is the program capable of keeping student progress records?

19. Is the documentation adequate? Documentation refers to the written manual that comes with a software package. It should include instructions for use, instructional objectives, and program design information.

Two excellent guides for the evaluation of courseware are available for purchase. They are well worth a modest investment for anyone interested in software.

Guidelines for Evaluating Computerized Instructional Materials, $3.75. National Council of Teachers of Mathematics, 1906 Association Drive, Reston, VA 22091.

Evaluator's Guide for Microcomputer-Based Instructional Packages, $2.50. International Council for Computers in Education, c/o Dept. of Computer and Information Science, University of Oregon, Eugene, OR 97403.

Trying to choose software is a difficult task. Local dealers have limited selections of courseware for the purchaser to preview. Many software companies expect to sell their wares directly from a catalog while making no provision for return of unsuitable programs. However, at least three educational software companies now allow for the return of merchandise within 30 days. These companies are K-12 Micro Media, Opportunities for Learning, Inc. and Scholastic Incorporated (see appendix). Larger companies, most of which have been in the textbook business for years, have regional sales representatives who will demonstrate software.

Some courseware is available free or at a low cost from educational computing groups. Two of the most well known are SOFTSWAP and MECC (Minnesota Educational Computing Consortium). These groups accept courseware developed for use in the public domain. The material is not copyrighted and may therefore be copied by individuals and school systems for classroom use. The idea is to encourage the construction

of instructional software by educators and to promote the friendly sharing of materials.

Software is also available which is designed to help instructional management. Computer managed instruction, popularly known as CMI, can ease the burden of record keeping and individualizing instruction. Some math and reading programs have a CMI feature available. The student takes a pretest and a prescriptive, individualized course of study is suggested. The program keeps a current record of student progress. A CMI program which figures grade point averages may be of value in adult secondary schools. CMI can be used to keep attendance records, mailing lists, and the statistical data required for final reports.

If it is not possible to get a first hand look at programs of interest, read the reviews in computer magazines. Educational computing magazines are now numerous. They all publish in depth software reviews. Several general computing magazines include reviews of educational software. It is a good idea to read the table of contents to be sure a certain issue contains information of interest before buying a general computing magazine such as Creative Computing or Popular Computing. Look at the reader correspondance section of the magazines to find out what others have to say about courseware they have used. Be sure that the material has undergone an adequate field testing program.

Many software companies have toll free numbers. Call and ask to talk to the program author or the educational representative. This is a good way to get information about how appropriate a certain program is for use with adults. Some courseware has been developed specifically for the adult learner and several companies contend that their courseware,

although not specifically designed for adults, is quite suitable for this group. Most publishers now producing textbooks for the ABE/GED student have adopted a wait and see policy before beginning production of microcomputer software for this population.

It is wise to make a thorough exploration of the software market before buying a microcomputer. Software is not interchangable from system to system. A diskette purchased for an APPLE II microcomputer will not work or run on a Radio Shack micro. Therefore, it is necessary to buy a computer for which a large amount of suitable software is available.

An educator's choice of hardware is likely to be one of the following: APPLE II, Commodore PET, or Radio Shack's TRS-80. A wide selection of software has been developed for these three computers. Texas Instruments and Atari have entered the education market with big ad campaigns and no doubt adequate software will become available soon for these machines.

There are two other important factors to consider in the selection of microcomputer hardware. These are price and the availability of repair service. Volume purchase usually means a lower cost per computer; however, local vendors or sellers are often willing to make a deal. In most cases, it is best to buy from a local vendor rather than from a mail order catalog or district sales representative. The likelihood of prompt service is better. Radio Shack has service centers nationwide, while APPLE and PET are sold by independent dealers. Some of these dealers are well prepared to service what they sell while others send equipment back to the factory. A good turn around time for repairs is

twenty-four hours or less. If it can't be fixed that quickly, a loaner computer should be provided to the customer. Obtain the details of a service policy in writing.

In addition to the three main components of a microcomputer, other hardware is sold that may be quite useful in an adult education program.

Printer - this device prints a paper copy of information seen on the video monitor.

Light pen - a pen which allows the user to convey information to the computer by touching the monitor instead of typing on the keyboard.

Speech synthesizer - a box which is able to combine phonemes to accurately pronounce an unlimited vocabulary of words.

Telephone modem - a translater which allows the microcomputer to send and receive information through telephone lines.

Another name for equipment which attaches to a microcomputer is peripheral. The printer, light pen, and speech synthesizer are self explanatory. The telephone modem, on the other hand, demands further description. Physically, a modem is a box which has a cradle into which an ordinary telephone receiver may be placed. There are several commercial information networks or data bases which a user may buy on-line time to use. It is possible to get information on hundreds of subjects including stock market figures, employment opportunities, news from UPI, book reviews, and daily horoscopes. One information retrieval service called Dialog contains the ERIC data base. ERIC is a collection of research reports in education which includes an index of more than 700 publications of interest to educators. The use of such a data base can save tedious hours of library research. All one has to do, for example, to obtain information about reading techniques for adult non readers is type an identifying phrase such as "adult non reader" and the computer will quickly list

the titles of all relevant articles in the ERIC file. The user may then choose to read selected articles in their entirety or have them copied on the printer for further study.

Electronic mail may be sent and received through an information network. An educator involved in planning a regional conference may need to send a letter to a colleague in another state. The letter is typed on the microcomputer, transmitted through telephone lines, and received on the colleague's microcomputer. If the person receiving the letter is at his or her terminal, an answer may be generated immediately. Some futurists predict that an electronic mail system will replace our current postal service.

INSIDE THE MICROCOMPUTER

It is not necessary to have an electronics background or even to be scientifically inclined to understand the way in which a microcomputer works. However, it is important to understand that the computer is nothing more than a dumb machine. The most complex tasks it can perform are the multiplication of two numbers or searching a list of numbers for a specified number.

The inside of a microcomputer contains silicon chips, each of which is about the size of a baby's fingernail. Technology has developed to the point that thousands of electronic circuits may be put on a chip. These circuits are composed of bits. Each bit is in one of two conditions - on or off. Eight bits make up a byte which, after undergoing several translations, may be understood as a letter or number by a person looking at a video monitor.

The language of the computer is called machine language and it consists of combinations of binary numbers. Binary numbers are those composed of 1's and 0's. For example, the letter A may be understood by the computer as 11000001 while the number 47 may be 101111. It is a tedious task to work with binary numbers, so assembly language was developed to simplify communication. This language uses symbols to represent machine language instructions. Assembly language was fine for computer scientists, but proved to be too difficult to be learned quickly by the rapidly increasing number of computer users. This fact led to the creation of easy to learn languages such as BASIC and PILOT. Thus, the letters and words that an ordinary microcomputer user types on the keyboard go through three translations.

A microcomputer has no moving parts. The silicon chips perform various mathematical operations by transmitting electronic impulses.

A microcomputer can execute 7000 arithemetic operations per second. These operations are performed by the central processing unit or CPU which processes all incoming information or input and sends requested information out as output.

A microcomputer has two types of memory. Read only memory or ROM is permanent, usually factory installed, and cannot be erased or easily changed. Random access memory or RAM is temporary memory. It stores information that is taken from a disk or tape, but loses the information when the computer is turned off.

Computer memory is measured in terms of K or Kilobytes. K is equal to 2^{10} or 1024 characters of information. Microcomputers possessing 16K, 48K, or 64K are commonly used in schools. A good way in which to determine the number of K to purchase is to check software requirements. All software catalogs list the brand name and number of K needed to use a particular piece of software. A 48K machine should be enough for a first time classroom purchase. The memory in most microcomputers is expandable so that additional amounts of memory may be purchased.

COMPUTER AWARENESS/COMPUTER LITERACY

The definition of computer literacy has never been particularly clear and it has changed over time. Most experts agree that to be computer literate one must know what a computer can and cannot do. One must also be aware of the political and moral implications of this advanced technology.

"Computer literacy - defined as what a person needs to know about and be able to do with computers in order to function competently in our society - is fast becoming a basic survival skill. One writer already calls computer literacy 'as much a social obligation as reading literacy' and another claims 'to get along in today's technological society people must have hands-on experience with computers before they leave formal schooling" (Linda Wyrick Winkle and Walter Matthews, Phi Delta Kappan, January, 1982).

"Computer literacy is knowing computers. It is knowing something of their function, of what they can and cannot do. Computer literacy is being aware of the distrust or fear some have for technology, especially electronic. Computer literacy is a lot of simple things. It is knowing enough to reject 'the computer made a mistake' excuse for ineffectiveness.

"Everyone must be computer literate tomorrow. The computer illiterate will be at an increasing disadvantage as computers permeate every aspect of our daily life. The time is getting short - we must prepare now". (Earl R. Savage, 80 Microcomputing, February, 1982).

Many definitions also include the ability to program in at least one computer language such as BASIC or PILOT.

Computer awareness is a knowledge level below computer literacy. It does not include hands-on experience or programming ability, but rather, it is an understanding of the fact that the computer is only a machine that is subject to the control of the man. A computer aware person knows that unethical or criminal use of the computer is possible and may be dangerous to both individuals and society as a whole.

Harold G. Shane identifies some of the possible problems associated with the computer revolution.

"For both educators and the general public, novel technological innovations and new solutions also create new problems among them:
*the need to produce specialists and at the same time preserve the merits of a general education;

*the question of striking a balance between the amount of reference material that theoretically can be stored and the amount actually needed;

*learning to cope with the prospect that as many as half of the jobs in the U.S. industry may be eliminated by 2000 or 2006;

*teaching learners to use information carefully rather than carelessly as it becomes more abundant and more available;

*educating the relatively few who master and direct the use of the new information technologies to use their advantage with prudence, integrity, and in the human interest;

*at least for the immediate future, dealing with perhaps the most paralyzing aspect of the microelectronics industrial revolution: namely 'the inability of lawmakers and sociologists to cope with what is occuring, because no one knows where to begin'; and

*perhaps most important, striking a balance between what is made technically possible by microelectronics and what is educationally desirable in learning situations. (Phi Delta Kappan, January, 1982).

In conclusion, it is the hope of this author that educators of those adults who lack basic skills will become actively involved in the computer revolution of the 1980's. Teachers, as well as students, must learn about this technology in order to take full advantage of it in the classroom. Even more importantly we must understand the sociological implications for a society in which the use of microcomputers will become increasingly widespread. Patricia Sturdivant, Associate Superintendent for the Department of Technology in the Houston Independent School District, recently made the following statement.

"By 1990, it is projected that 40 million people will be needed to operate computers in the U.S. Recent projections by Congress indicate that by 1985, eight out of ten adults will need to use a computer just to function in their jobs. The child who enters school today will graduate into a job market in which 75 percent of the jobs do not even exist today." (Electronic Education, March/April, 1982).

The preceding quotation accurately reflects information found in current literature. We must prepare ourselves and our students for the coming of a very computerized society. If we do not become actively involved with

computers, decisions about their use will be made by individuals and groups outside the field of education. We need to learn all we can about computers including the ways in which these machines can be used in an instructional setting and the extent to which the new technology will continue to produce rapid change in our world.

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APPENDIX

EDUCATIONAL COMPUTING ORGANIZATIONS

CUE - Computer Using Educators is a nonprofit California Corporation whose purpose is to promote and improve computer use in schools and colleges. CUE has over 2,600 members in 42 states. The organization's main activities are a bi-monthly newsletter, four major conferences per year, and SOFTSWAP, an educational software library and exchange. Membership is $6.00 per year.

CUE Membership
P.O. Box 18547
San Jose, CA 95158

ADCIS - Association for the Development of Computer-based Instructional Systems has four purposes.

1. To advance the investigation and use of computer assisted instruction and management.
2. To promote and facilitate the exchange of educational computing information.
3. To reduce redundant efforts among software developers.
4. To specify requirements of software and hardware development.

ADCIS
Miller Hall 409
Western Washington University
Bellingham, WA 98225

ICCE - International Council for Computers in Education strongly encourages and will aid the formation of organizations working to facilitate instructional uses of computers. Individual membership is automatic with a subscription to The Computing Teacher magazine.

David Moursand, President
ICCE, Dept. of Computer and Information Services
University of Oregon
Eugene, OR 97403

AEDS - Association for Educational Data Systems is a private, non-profit organization founded in 1962 by a group of professional educators and technical specialists in educational applications. Its intention is to provide a forum for the exchange of ideas and information about the relationship of modern technology to modern education.

AEDS
1201 Sixteenth St. N.W.
Washington, D.C. 20036

EDUCATIONAL MICROCOMPUTER NEWSLETTERS

Apple Educator's Newsletter
9525 Lucerne Street
Ventura, CA 93004

Apple Education News (free)
10260 Bandley Drive
Cupertino, CA 95014

CUE - Computer Using Educators
Don McKell
Independance High School
1776 Education Park Drive
San Jose, CA 95133

MEAN Brief
Microcomputer Education Applications Network
256 N. Washington Street
Falls Church, Virginia 22046

MECC Users Newsletter
2520 Broadway Drive
St. Paul, MN 55113

Microscope
JEM Research
Discovery Park
University of Victoria
P.O. Box 1700
Victoria, B.C. VBW 242

Micro SIFT News
Northwest Regional Educational Laboratory
300 S.W. Sixth Avenue
Portland, OR 97204

TI Source Newsletter
Microcomputer
P.O. Box 191
Rye, NY 10580

MICROCOMPUTER MAGAZINES

The following magazines are general in content and sometimes have applications for education. Most articles are not too technical. These magazines are sold at book stores, drugstores, and computer stores.

Creative Computing

Personal Computing

Popular Computing

Interface Age

Info World

80 Microcomputing

Compute!

BYTE

Kiloband Microcomputing

The following periodicals are written for educators and are available by subscription.

Classroom Computer News - $16 for 6 issues/yr.
51 Spring Street
Watertown, MA 02172

T.H.E. Journal -
Technological Horizons in Education
P.O. Box 992
Acton, MA 01720

The Computing Teacher - $14.50 for 9 issues/yr.
Dept. of Computer and Information Services
University of Oregon
Eugene, OR 97403

Educational Technology - $49 for 12 issues/yr.
140 Sylvan Avenue
Englewood Cliffs, N.J. 07632

Instructional Innovator
AECT
1126 16th St. N.W.
Washington, D.C. 20036

Educational Computer - $12 for 6 issues/yr.
P.O. Box 535
Cupertino, CA 95015

Electronic Education - $10 for 10 issues/yr.
Suite 220 1211 Executive Center Drive
Tallahassee, FL 32301

Electronic Learning - $17 for 5 issues/yr.
902 Sylvan Avenue
Englewood Cliffs, NJ 07632

Microcomputers in Education - $24 for 12 issues/yr.
5 Chapel Hill Drive
Failrfield, CT 06432

BOOK CATALOGS

Brain Food
Dilithium Press
P.O. Box 606
Beaverton, Oregon 97075

Creative Computing Catalog
Software, Perepherals, Books
39 E. Hanover Avenue
Morris Plains, New Jersey 07950

Group Technology, Ltd.
P.O. Box 87
Check, Virginia 24072

BYTE/ McGraw-Hill Books
70 Main Street
Peterborough, New Hampshire 03458

Computer Books & Programs
Entelek
Ward-Whidden/The Hill
P.O. Box 1303
Portsmouth, New Hampshire 03801

INFORMATION NETWORKS

Compu Serve
Information Services Division
5000 Arlington Center Boulevard
Columbus, Ohio 43220

Dialog
3460 Hillview Avenue
Palto Alto, California 94304
(Contains ERIC database of educational materials)

Source
1616 Anderson Road
McLean, Virginia 22102

EDUCATIONAL PUBLISHING COMPANIES

The following companies provide detailed brochures for their software. Most have 1-800 numbers and regional sales representatives. The materials are comprehensive and expensive. Investigate well before purchasing.

Borg-Warner Educations Systems
600 West University Drive
Arlington Heights, Illinois 60004

This company has a Critical Reading program that received an excellent review in Educational Technology magazine, September 1981. It runs on Apple II and may be purchased for $750.00. A lease option is also available. In addition a Word Structure Series which covers capitalization, spelling, possessives, prefixes and suffixes has been developed.

Chronical Guidance Publications, Inc.
Moravia, New York 13118

Career Guidance is provided in a four step program called Discover II. Assessment of interests, aptitude, and values is analyzed and suggested job titles and descriptions are presented. Systems operate on Apple II and TRS-80 for $1,500.

Milliken Publishing Company
1100 Research Boulevard
St. Louis, Missouri 63132

Math, reading and language arts programs for Apple II have been developed. Some materials have been converted for TSR-80, TI, and Atari. The Math Sequences and Comprehension Power Program have been favorably received. Math, grades 1-8 is $450. Reading program is $150 per grade level.

Random House School Division
400 Hahn Road
Westminster, Maryland 21157

The catalog describes materials for TRS-80 and Apple II in the subject areas of reading, language arts, mathematics and management.

SRA
Science Research Associates, Inc.
155 North Wacker Drive
Chicago, Illinois 60606

SRA offers several comprehensive packages for the Atari 800 and the APPLE II. Subjects include computer drill and instruction in mathematics and phonics. The phonics has a cassette based sound track and lessons designed to appeal to learners of all ages.

TSC/Houghton Miffin
Dept. 35
Box 683
Hanover, New Hampshire 03755

Career guidance programs have been developed which may be obtained over phone lines and the company's Dolphin Computer. Basic reading and math programs have been developed by TSC. This curriculum runs only on the Dolphin microcomputer.

Computer Assisted Instruction, Inc.
6115 28th Street, S.E.
Grand Rapids, Michigan 49506

Comprehensive reading and vocabulary program written for reading grade levels 4-12. Content is designed to be appropriate for adults. Available for APPLE II and TRS-80.

Addison-Wesley Publishing Company
Software Marketing
Reading, MA

Three software packages are available for school administrators. These include an accounting system, an inventory system, and a purchasing system. Developed for APPLE II and TRS-80

Readers Digest
Educational Division
Pleasantville, N.Y. 10570

Edu-Disks for mathematics and problem-solving that are correlated with popular textbooks. Programs run on APPLE II, Atari, and TRS-80. Cost is about $130 per grade level.

MICROCOMPUTER MANUFACTURES

Apple Computer, Inc.
10260 Bandley Drive
Cupertino, California 95014

Atari
1265 Borregos Avenue
Sunnyvale, California 94086

Commodore PET
950 Rittenhouse Road
Morristown, Pennsylvania 19401

Radio Shack
700 One Tandy Center
Fort Worth, Texas 76102

Texas Instruments
P.O. Box 53
Lubbock, Texas 79408

LIST PRICES

The following information provides a general idea of the microcomputer price range. Check locally for more accurate figures.

Apple - Single disk system, Apple II Plus with 32K bytes of RAM, $2075.

Atari - Single disk system, with 32K bytes of RAM, $1780.

PET - Single disk system, built in monitor, 32K bytes of RAM, $1500.

TRS-80 - Model III, single disk system, 48K bytes of RAM, $1995.

TI - Texas Instruments, single disk system, 16K RAM and 26K RAM, television inferface, $1370.

SOFTWARE REVIEW CATALOGS

Software Review, Microform Review, Inc., 520 Riverside Avenue, Westport, CT 06880

Reference Manual for Instructional Use, JEM Research, Discovery Park, University of Victoria, P.O. Box 1700, Victoria, BC V8W2Y2,

School Microware Review, Dresdan Associates, P.O. Box 246, Dresdan, ME 04342. Reviewed in Ed. Tech. Feb. '82 pg. 45.

Micro SIFT News , Northwest Regional Educational Laboratory, 300 S.W. Sixth Avenue, Portland, OR 97204. Reviews are full of information, but not enough to make purchase based on review alone.

Educational Software Directory, Sterling Swift Publishing Company, P.O. Box 188, Manchaca, TX 78652.

Educators Handbook and Software Directory, Vanloves, 7899 Martin Drive, Overlook Park, KS 66204.

The Journal of Courseware Review, Foundation for the Advancement of Computer Aided Education, P.O. Box 28426, San Jose, CA 95159. Apple publication that reviews selected courseware; excellent reviews by experienced educators. This may be available from local APPLE dealers.

Software Review, Microform Review, Inc., 520 Riverside Avenue, Westport CA 06880. This review is published twice a year for educators and librarians. Reviews are contributed by software users and edited by Pratt Institute faculty members. $38.00.

Queue, 5 Chapel Hill Drive, Fairfield, CT 06432.

SOFTWARE CATALOGS

Bertamax, Inc.
101 Nickerson, Suite 550
Seattle, Washington 98109
(Apple, TRS-80)

Brain Box 601 W
601 West 26th Street
New York, NY 10001
(Apple, PET)

Charles Mann & Associates
Microcomputer Division
55722 Santa Fe Trail
Yucca Valley, CA 92284
(Apple, TI 99/4, TRS-80)

Computer Courseware Services
EMC Publishing/Changing Times
Education Service
300 Hork
St. Paul, MN 55101
(Apple, TRS-80)

Conduit
100 Lindquist Center
P.O. Box 388
Iowa City, Iowa 52244
(Apple, TRS-80)

Creative Computing Software
Morris Plains, NJ 07950
(Apple, Atari)

Dr. Daley's Software
Water Street
Darby, Montana 59829
(Apple, PET)

Dynacomp, Inc.
1427 Monroe Avenue
Rochester, NY 14618
(Apple, Atari, PET, TRS-80)

Educational Activities, Inc.
Freeport, NY 11520
(Apple, PET, TRS-80)

EDU-Soft
4639 Spruce Street
Philadelphia, PA 19139

Educational Software
P.O. Box 746
McMinnville, Oregon 97128
(Apple, Atari, PET, TRS-80)

JL Hammet Co., Inc.
Hammet Place
Box 545
Braintree, Maryland 02184
(Apple, PET, TRS-80)

Instant Software
Peterborough, NH 03458
(Apple, PET, TRS-80)

Interactive Fantasies
Edu-Ware Services, Inc.
P.O. Box 22222
Agoura, CA 91301
(Apple, Atari)

K-12 MicroMedia, Inc.
P.O.Box 561
Valley Cottage, NY 10989
(Apple, PET, TRS-80)

Krell Software Corporation
21 Millbrook Drive
Stonybrook, NY 11790
(Apple, PET, TRS-80)

Marck
280 Linden Avenue
Branford, Connecticut 06405
(Apple, Atari, PET, TRS-80)

Micro Learningware
P.O. Box 2134
N. Mankato, Minnesota 56001
(Apple, PET, TRS-80)

Microcomputer Corporation (Texas Instruments)
34 Maple Avenue Box 8
Armonk, NY 10504

Minnesota Educational Computing Consortium
2520 Broadway Drive
St. Paul, MN 55113

Opportunities for Learning, Inc.
8950 Lurline Avenue, Dept. 26CD
Chatsworth, CA 91311
(Apple, PET, TRS-80)

Program Design, Inc.
11 Idar Court
Greenhich, Connecticut 06830
(Apple, PET, TRS-80)

Programs for Learning, Inc.
P.O. Box 954
New Milfort, Connecticut 06776
(Apple, PET, TRS-80)

Quality Educational Designs
P.O. Box 12486
Portland, OR 97212
(Apple, TRS-80)

Scholastic, Inc.
904 Sylvan Avenue
Englewood Cliffs, NJ 07632
(Apple, Atari, PET, TI, TRS-80)

SOFTSWAP Microcomputer Center
San Mateo County Office of Education
333 Main Street
Redwood, CA 94063
(Apple, Atari, PET, TI, TRS-80)

SVE
Society for Visual Education, Inc.
1345 Diversey Parkway
Chicago, IL 60614
(Apple, PET, TI, TRS-80)

Teaching Tools
P.O. Box 50065
Palo Alto, CA 94303
(Apple, PET)

The Micro Center
Dept. S-42
P.O. Box 6
Pleasantville, NY 10570

SOFTWARE CATALOGS FOR APPLE II

AEN
9525 Lucerne
Ventura, California 93004

Compu-Tations
P.O. Box 502
Troy, Michigan 48099

Computer-Advanced Ideas
1442 A Walnut Street, Suite 341
Berkeley, California 94709

CYGNUS Software
8002 E. Culver
Mesa, Arizona 85207

Educational Courseware
3 Nappa Lane
Westport, Connecticut 06880

Hartley Courseware, Inc.
P.O. Box 431
Dimondale, Michigan 48821

High Technology Software Products, Inc.
P.O. Box 14665
8001 Classen Boulevard
Oklahoma City, Oklahoma 73113

Huntington Computing
1945 South Dairy Avenue
P.O. Box 787
Corcoran, California 93212

Interpretive Education, Inc.
Mall Plaza, Suite 250
157 S. Kalamazoo Mall
Kalamazoo, Michigan 49007

Math Software
1233 Blackthorn Place
Deerfield, IL 60015

Modular Educational Programs
Box 100
Tyner, Indiana 46572

Muse Software
330 N. Charles Street
Baltimore, Maryland 21201

SouthWest EdPsych Services, Inc.
P.O. Box 1870
Phoenix, Arizona 85001

TSE Hardside
14 South Street
Milford, New Hampshire 03055

SOFTWARE FOR TRS-80

Acorn Software Products, Inc.
634 N. Carolina Avenue, S.E.
Washington, D.C. 20003

Basics and Beyond, Inc.
Box 10
Amawalk, NY 10501

DEMI-Software
6 Lee Road
Medfield, Maryland 02052

MicroGnome
5843 Montgomery Road
Elkridge, Maryland 21227

Precision People
P.O. Box 17402
Jacksonville, FL 32216

3R Software
P.O. Box 3115
Jamaica, NY 11431

SOFTWARE CATALOGS FOR PET

Cow Bay Computing
Box 515
Manhasset, NY 11030

Educational Connection
1508 Coffee Road, Suite J
Modesto, CA 95355

Microcomputers in Education
Robbinsdale Area Schools
Independent School District 281
4148 Winetta Avenue, No.
Minneapolis, MN 55427

Microphy's Programs
2048 Ford Street
Brooklyn, NY 11229

Sheridan College
1430 Trafalgar Road
Oakville, Ontario, Canada L6H 2L1

Tycom Associates
68 Velma Avenue
Pittsfield, MA 01201

OTHER VALUABLE RESOURCES

Classroom Computer News - July-August 1981 issue- 'The First Annual Compendium of Common and Uncommon Computer Lore'- This issue is full of resource information. $4.00. Write: Compendium, Computer News, P.O. Box 266, Cambridge, MA 02138.

The Micro Millennium - by Christopher Evans - A discussion of past, present, and future computer applications and concerns by one of the world's leading authorities on microcomputers. $3.50. Washington Square Press, 1230 Avenue of the Americas, New York, NY 10020.

Guidelines for Evaluation Computerized Instructional Materials, $3.50. Write: National Council of Teachers of Mathematics, Inc. 1906 Association Drive, Reston, VA 22091.

Computers for Everyone - by Jerry Willis and Merl Miller. Provides much specific information about microcomputers and how to purchase one wisely. $4.95. Dilithium Press, P.O. Box 606, Beaverton, OR 97075.

The Computer in the School: Tutor, Tool, Tutee, edited by: Robert Taylor. A collection of articles by five well known educators who are considered pioneers in the field of computers in education. $14.95. Teachers College Press. Available from Scholastic, Inc., 904 Sylvan Avenue, Englewood Cliffs, NJ 07632.

The Electronic Cottage by Joseph Deken, "A wide ranging discussion of things computers can do, how they work, and how they may change our everyday lives." Computer Magazine, Jan. 1982. William Morrow and Company, New York, NY.

First Book of Microcomputers provides an introduction to microcomputers and their terminology. Hayden Book Co., Rochelle Park, N.J.

Are You Computer Literate? by Karen Billings and David Moursund. This is a self instruction book for the novice to computers. It contains quizzes and a final examination. Dilithium Press, P.O. Box 606, Beaverton OR 97075. $8.95.

Mindstorms: Children, Computers, and Powerful Ideas by Seymour Papert. Basic Books. $12.95. Author explains how LOGO computer language can change the way in which children learn. Scholastic Inc. , 904 Sylvan Avenue, Englewood Cliffs, N.J. 07632.

Computers and Education by James Piorot. Provides information on microcomputers and their uses in an educational setting. It includes history, current applications, and future trends. $7.95. Sterling Swift, 1600 Fortview Road, Austin, TX 78704.

Owning Your Home Computer by Robert Perry. This is a valuable reference book. It explains what home computers are and how they work. It includes a detailed explanation of most microcomputers on the market including plenty of pictures. $4.95. Playbook Paperbacks, Book Mailing Service, P.O. Box 690, Rockville Center, N.Y. 11571.

The Computer Age: A Twenty-Year View edited by: Michael L. Detouzos and Joel Moses. $9.95. Twenty top computer authorities explore the structure of our information society and the changes which the future will bring. Available from Entelek, Word-Widden House/ The Hill, P.O. Box 1303, Portsmouth, NH 03801

You Just Bought A Personal What? by Thomas Swyer and Margot Critchfield, $11.95. This is an introductory book on programming in BASIC language. BYTE/McGraw-Hill Books, 70 Main Street, Peterborough, NH 03458.

Don't (Or How to Care for Your Computer) by Rodney Zaks. $11.95. The physical care of a microcomputer and its parts is explained. An excellent resource for first time computer users. Sybex, Inc., 2344 Sixth Street, Berkeley, CA 94710.

Introduction to Computers in Education for Elementary and Middle School Teachers by David Moursand, $7.00. A comprehensive presentation of many aspects of educational computing which includes a broad general overview of hardware, software, and computer related information is given. International Council for Computers in Education, Dept. of Computer and Information Science, University of Oregon, Eugene, OR 97403.

The Third Wave by Alvin Toffler. $3.75. The idea that our society is undergoing a computer revolution is developed. This revolution will bring about radical changes in society as we know it. Bantam Books.

Microcomputing and the 3 R's Christine Doerr. $7.75. A description of microcomputers and how to organize a CAI program. Hayden Book Company.